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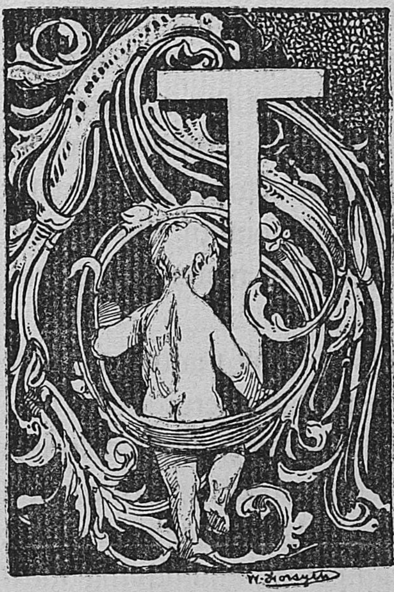
COLOR: MR. PRANG'S NEW THEORY



THE world has long known standards of weights and measures, but to Mr. Louis Prang, of the Prang Educational Company, within the past few years, are we indebted for standards of color.

All colorists have demonstrated that pigments producing red, yellow and blue color sensations, have been the chief elements comprising all known color and for many years red, yellow and blue were indisputably the three primary colors. Recently, scientists have questioned the truth of this theory, claiming that their experiments in combining different rays of spectrum color have failed to prove the truth of this assertion. For instance, they found that blue and yellow combined on the Maxwell disk produced gray instead of green and after various similar experiments resulting in an equally perplexing manner, they told us that red, green and blue violet were the primary colors, instead of red, yellow and blue.

This verdict did not satisfy the practical colorist, for it entirely contradicted evidence gained by the mixing of pigments and it was with a view of clearing this problem that Mr. Prang investigated the subject. He learned that the latest scientists in their experimental work had used ultramarine blue, which is not pure blue, but has some red in it, with chrome yellow, which is not pure yellow, but also has some red in it, thus combining not only blue and yellow, but blue, yellow and red; the three colors which the early scientists claimed would neutralize each other. He then felt that in order to get green from a combination of blue and yellow, he must use a pure blue with a pure yellow, a theory which he has since proven.

Nearly every scheme for the study of color is based upon the solar spectrum, as a natural standard for physical color, but as this gives no typical red (the red of the spectrum being distinctly yellowish) and shows none of the intermediate colors between red and violet, it is incomplete. Again, we find that the spectrum at sunrise, at noon and at sunset, under various conditions of the atmosphere, differs perceptibly, thus proving that there is no absolute type of any color to be found in nature. Mr. Prang, therefore, feels that for this and other practical reasons, the development of the subject must be made through the use of pigments, or materials colored with pigments.

To fix upon proper types of color was no easy matter, as there were no standards of color. The different manufacturers of pigments differed as to the tones and hue of a color, while colorists differed as to the pigments that represented the best type of a color. He therefore appreciated that scientific and artistic color study must have for its basis a standard scale of fixed colors, embodying ideal types of all known color and that the types selected must be as satisfactory to the esthetically trained color sense as the practical condition of the pigment handling render possible.

Such a scale has been prepared, the individual types having been fixed after long study of the scientific theory of color, wide experience in the actual use of color in art and in the industries, and repeated conference with color experts, both American and European.

Therefore, in any ideal unit of pure colors, it has been necessary to complete the color series of the spectrum by the addition of the missing typical red and reddish hues, thus filling up the gaps between violet and spectrum red.

For an ideal unit of all possible colors and a type of perfect harmony in color, Mr. Prang proposes a solid chromatic sphere, having all the normal spectrum colors at the equatorial zone, which colors gradually fade by additional luminosity into white at the North Pole and fade by gradually decreasing luminosity into black at the South Pole, thus having within the area of the sphere, not only all the tones of all the positive spectrum colors, but all the tones of all the possible grays.

For practical purposes, he has divided the pure color unit into twenty-four equal intervals, upon which he bases his twenty-four normal hues, each of which serves as the middle tone for a self scale of five tones. These twenty-four self scales he supplements by seven gray scales of five tones each. This thus comprises a table of one hundred and fifty-five standard hues, given in painted papers. The scheme as carried out is shown in the diagram at the back of the magazine.

In the ideal unit of pure color he aims not only to supply the missing colors of the solar spectrum, but also to make the ideal type or normal tone of an individual color the most strongly characteristic of that color, and in so doing he not only considers the color individually, but considers it in its relation to the entire scale.

The present invested scale consists of six leading colors—red, orange, yellow, green, blue and violet—and six intermediates, as red violet, red orange, yellow orange, yellow green, blue green and blue violet. It will be seen that the intermediate color partakes of its two immediate neighbors, as red orange consists of equivalents of red and orange, yellow orange, of yellow and orange, and so on.

The simplicity and good sense of such a nomenclature was very apparent in a kindergarten at Grand Rapids, Michigan, a month ago. The children were familiar with red and orange and the teacher held up red-orange for their observation. One child said, "It is not red," another said, "It is not orange," when a third said, "Let us call it red orange." Who has not had the experience of wondering what color crushed strawberry was, or robin's egg blue, or Nile green, or even cherry red, and this suggests the story of the boy who said he had a cherry-colored cat and being questioned further as to its real color said, "a black cherry."

It is quite evident that many people are insensible to variations or modifications of color. Lucy Crane says, "Think, for instance, of the number of tints that red has to do duty for—red brick, red currants, red wine, red-breast, red hair, red faces, red coats, a red Indian, red sandstone, red ink, red ochre, red tape. Vermillion, coral, carnations, cochineal, carmine, rubies, carbuncles, garnets, cherries, poppies, roses, blushes—are all called red. We say, as red as fire, as red as blood, as red as a turkey cock. 'The whole hillside was redder than a fox,' says Tennyson." We even sometimes hear that green blackberries are red.

She says: "These things can not really all be red, and the fact is that none of them are absolute red. No one's hair is really red, just as no one's eyes are absolutely blue. Poverty of language and coarseness of perception must have originally given all these colors but one name." While there is but one tone that can answer to red, there are many that are reddish and we should be able to carry in our minds a concept of pure color, which is standard, in order that we may compare with it any other broken red, observing whether it is lighter or darker, as in the tints and shades, or whether it is modified by little or much yellow, making it orange red, or red orange; or modified by little or much blue, making it violet red or red violet; or modified by both yellow and blue, so that it may become red gray or russet.

The colorist, whether he be artist or artisan, must carry with him color concepts that will enable him to analyze all color effects, and to have this power it is necessary to develop the color sense to the extent of not only perceiving color, but of imaging it, retaining it and expressing it. With this end in view has color been put into the public schools, that it may administer esthetically and practically to the wants of the individual.

In outlining a course of study for the children we begin with the normal tones of each of the six leading colors—red, orange, yellow, green, blue and violet. This is done because we wish the child to become familiar with correct standards of pure color and also because we find that he wants positive colors. He has an appetite for bright color that needs satisfying as much as his appetite for food. An illustration of this occurred in relation to the child of a friend, who had only been given books in which the illustrations were colored in the most approved manner. The mother was congratulating herself upon the child's not having been exposed to poor color combinations, therefore acquiring good taste, when one day a package arrived containing some cheap books, with accompanying cheap illustrations and coloring. To the utter dismay of the mother, the child was completely carried away with the pictures, showing an appreciation for them that had never been evinced for any of the dainty and artistic coloring of the high priced books.

It is plain that the strong bright colors belong to childhood.

It is the teacher's experience that the child or adult who has not had bright color will want it, but as rapidly as his appetite is satisfied is he ready to pass on to their broken tones, or modifications in grays and browns. It may be owing to this fact that we find so many clashing strong colors in the average drawing-room. Starvation of bright color in childhood leaves a demand for it in the grown man or woman.

In our outline for children we aim to have them first combine only self tones of one color in any piece of decorative coloring, for we feel that the normal tones of the different colors can not be combined harmoniously or with good effect.

The artist using paints may combine any strong colors, for he has that instinctive color feeling which enables him to key his scale and to temper the colors to each other, which he might not be able to do with fixed colored papers.

We are frequently asked, "Why not combine normal tones of different colors? Are they not so found in nature? Do we not see the red rose and the green leaf in juxtaposition and do we not find violet, orange and yellow in the same pansy? Is not the parrot decked in bright greens, reds, blues and yellows?"

Yes, but are we sufficiently wise and potent to compete with Nature? Think of the material she uses, with its underlying life energy. How can the stuffs in our wall papers, carpets, furnishings, draperies, compare with the delicate textures of the translucent petal of a rose, or the exquisiteness of the texture of a butterfly's wing?

Again our products are long lived. The same wall paper and carpets are with us some times for years, while the brilliant colorings of nature are very transitory. The beautiful sunset, ever-changing, lasts but an hour. The rainbow fades before our eyes. The exquisite flower is very perishable and the brilliancy of the autumn tints changes to brown with the ripening of the leaves. Nature gives us fresh flowers every day, whereas our wares must last a certain time, as they do not grow spontaneously.

Suppose we were able to imitate these brilliant natural colors. Could they enter into our decorations with satisfaction to us? Should we care for them if they were constantly and unchangingly before our eyes? A constant succession of bright colors is apt to affect the color sense as a continuous loud sound does the sense of hearing. To imitate nature with our materials would indeed be a hopeless task. So we can, at best, but study natural color effects and adapt to our needs all that we can creditably utilize. Nature colors all her large surfaces with broken tones, reserving her positive and brilliant hues for the smaller objects of life, as insects, butterflies and birds, flowers, and some fruits, while the larger animals, as the elephant, the horse, the dog, are clothed in grays and browns. The great mass of rock is gray or brown, while the gem imbedded in it, so small in proportion, is of a brilliant hue. The sky is not evenly and permanently blue. It scales from a deep blue in the zenith to almost white in the horizon and is continually changing its coloring from sunrise to sunset. The great field of grass is not all an intense green, to our vision. It is modified by atmospheric conditions, the green in the foreground gradually melting into browns and broken violets in the distance.

The amount of surface to be covered with a color has much to do with its positive character; while a small sample of a color may appear broken and subdued, when it is continued over a large space it apparently becomes quite a different tone. I recall the experience of a friend who bargained to have a house painted with a very dull green, which she selected from a sample book of colors. Upon seeing it when finished, she was very indignant that the painter had not used the color she selected. Instead of the quiet green, she found a very bright and trying one. Upon demanding an explanation, her sample was shown her in connection with the house, the painter proving he had followed her directions. She then saw that what had been very modest in a small quantity was very bold and self-assertive in a large quantity. We may sometimes question whether this does not in a measure explain the very poor coloring on many houses. The same will be found true in hanging walls with plain ingrain papers. We frequently hear that the walls do not meet the expectation of the individual selecting the paper.

Again, different materials, owing to their different textures, reflect the same color so differently. If we should use the same dye for paper, cotton cloth, woolen cloth, silk, satin, velvet, plush, leathers, and woods, we should find as great a variety of color sensations as there were materials and as we study the different colorings of these different materials in ordinary use we feel that certain colors are better adapted to certain materials than others and that on the whole, those objects are the most pleasing and satisfactory, wearing best and longest, that are of a quiet nature, or as Ruskin says, "It is the best possible sign of a color when nobody who sees it knows what to call it."

After our children have studied twelve spectrum colors and seven different grays and made simple decorative arrangements, combining only self tones of one color in an arrangement, we are ready to have them study effects of juxtaposition of contrasting colors.

We find that a color individually, and a color in relation to other surrounding colors, are two very different things. It is interesting to study the effects of the same color—a neutral gray, for instance—mounted separately on the normal tone of the six leading colors. Not only do the grays differ in intensity, but they also differ in regard to hue. The gray on the violet looks very light and warm, while the gray on yellow looks very deep and has a violet cast and the one on orange seems decidedly cold. Again, by mounting bits of normal red or any other color on a white, a neutral gray and a black background, similar differences will be apparent, the difference being so great that the three mounts appear as three distinct tones of the same color.

Very often are we deceived, as to the tones of colors that are found in Oriental textures and rugs. I remember having my attention called to the positive reds in a Turkish rug. I, too, thought the color almost normal, but upon looking at it more closely and comparing it with the standard normal red, I found to my utter amazement that it faded into a brown in contrast. I then learned that it was not necessary to use positive colors to get brilliant effects. The Oriental races perfectly knew, or I should say, felt, what colors would complement and enhance each other and this is the secret of their chromatic success. If we were able to dissect a Turkish rug and disarrange the color, placing each away from the others, I think we would find very few bright colors.

In our study of color effects we have no positive standards of right and wrong, no fixed means of judgment. All as yet is approximative, merely. Yet we know that those whose study of color has been long and serious, and whose tastes have been highly cultivated, are constantly reaching certain results that lead us to feel that there are certain laws and principles underlying all harmony in color combinations. We therefore must aim to develop our color perception, not only to the extent of recognizing color but of appreciating good color effects, both in good examples of historic ornament and in modern industrial art, trusting that by the sincerity of our study our observation may be developed to the utmost, enabling us to appreciate all that is harmonious and beautiful in nature and in art.

KATHERINE M. BALL

CHART OF THE PRANG COLOR THEORY

TO ACCOMPANY MISS BALL'S PAPER

LL R	LL RRO	LL RO	LL ORO	LL O	LL OYO	LL YO	LL YYO	LL Y	LL YYG	LL YG	LL GYG	LL G	LL GBG	LL BG	LL BBG	LL B	LL BBV	LL BV	LL VBV	LL V	LL VRV	LL RV	LL RRV
L R	L RRO	L RO	L ORO	L O	L OYO	L YO	L YYO	L Y	L YYG	L YG	L GYG	L G	L GBG	L BG	L BBG	L B	L BBV	L BV	L VBV	L V	L VRV	L RV	L RRV
R	RRO	RO	ORO	O	OYO	YO	YYO	Y	YYG	YG	GYG	G	GBG	BG	BBG	B	BBV	BV	VBV	V	VRV	RV	RRV
D R	D RRO	D RO	D ORO	D O	D OYO	D YO	D YYO	D Y	D YYG	D YG	D GYG	D G	D GBG	D BG	D BBG	D B	D BBV	D BV	D VBV	D V	D VRV	D RV	D RRV
DD R	DD RRO	DD RO	DD ORO	DD O	DD OYO	DD YO	DD YYO	DD Y	DD YYG	DD YG	DD GYG	DD G	DD GBG	DD BG	DD BBG	DD B	DD BBV	DD BV	DD VBV	DD V	DD VRV	DD RV	DD RRV

LL—lighter
L—light
N—normal
D—dark
DD—darker

R—red
RRO—red-red-orange
RO—red-orange
ORO—orange-red-orange
O—orange, etc.

Y—yellow
G—green
B—blue
V—violet, etc.

LL Gy	LL RGy	LL OGy	LL YGy	LL GGy	LL BGy	LL VGy
L Gy	L RGy	L OGy	L YGy	L GGy	L BGy	L VGy
Gy	RGy	OGy	YGy	GGy	BGy	VGy
D Gy	D RGy	D OGy	D YGy	D GGy	D BGy	D VGy
DD Gy	DD RGy	DD OGy	DD YGy	DD GGy	DD BGy	DD VGy

GRAYS

RGy—red-gray or russet
OGy—orange-gray or brown
YGy—yellow-gray or citrene
GGy—green-gray or olive
BGy—blue-gray or slate
VGy—violet-gray or heliotrope
Gy—neutral gray